CLAIMS

WHAT IS CLAIMED:

1. A method, comprising:

providing a substrate;

performing a deposition process to form a process layer above said substrate;

determining at least one of a weight and a mass of said process layer formed above said substrate; and

controlling at least one parameter of said deposition process based upon said determined weight or mass of said process layer.

2. The method of claim 1, wherein providing a substrate comprises providing a substrate comprised of silicon.

3. The method of claim 1, wherein performing a deposition process to form a process layer above said substrate comprises performing at least one of a chemical vapor deposition process, a plasma enhanced chemical vapor deposition process, a thermal growth process, and a physical vapor deposition process to form a process layer above said substrate.

4. The method of claim 1, wherein performing a deposition process to form a process layer above said substrate comprises performing a deposition process to form a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 above said substrate.

5. The method of claim 1, wherein determining at least one of a weight and a mass of said process layer formed above said substrate comprises:

providing a pressure sensor that senses a pressure induced as a result of forming said process layer above said substrate; and

calculating said weight or mass of said process layer based upon said sensed pressure.

6. The method of claim 5, wherein providing a pressure sensor comprises providing a pressure sensor in contact with said substrate.

7. The method of claim 5, wherein calculating said weight or mass of said process layer based upon said sensed pressure comprises calculating said weight of said process layer by multiplying said sensed pressure and an area of said substrate covered by said process layer together.

8. The method of claim 1, wherein determining at least one of a weight and a mass of said process layer formed above said substrate comprises measuring a weight or a mass of said process layer using at least one of a scale and a balance.

9. The method of claim 1, wherein controlling at least one parameter of said deposition process based upon said determined weight or mass of said process layer comprises stopping said deposition process based upon said determined weight or mass of said process layer.

10. The method of claim 1, wherein controlling at least one parameter of said deposition process based upon said determined weight or mass of said process layer

comprises controlling at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said determined weight or mass of said process layer.

11. The method of claim 1, further comprising performing said deposition process for an additional duration if said determined weight or mass of said process layer is not within a preselected limit.

12. The method of claim 1, further comprising adjusting at least one parameter of said deposition process based upon said determined weight or mass of said process layer and performing said deposition process comprised of said adjusted parameter on at least one subsequently processed substrate.

13. A method, comprising:

providing a substrate;

performing a deposition process to form a process layer above said substrate;

providing a pressure sensor that senses a pressure induced as a result of forming said process layer above said substrate;

calculating a weight of said process layer based upon said sensed pressure; and

controlling at least one parameter of said deposition process based upon said calculated weight of said process layer.

14. The method of claim 13, wherein providing a substrate comprises providing a substrate comprised of silicon.

15. The method of claim 13, wherein performing a deposition process to form a process layer above said substrate comprises performing at least one of a chemical vapor deposition process, a plasma enhanced chemical vapor deposition process, a thermal growth process, and a physical vapor deposition process to form a process layer above said substrate.

16. The method of claim 13, wherein performing a deposition process to form a process layer above said substrate comprises performing a deposition process to form a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 above said substrate.

17. The method of claim 13, wherein providing a pressure sensor comprises providing a pressure sensor in contact with said substrate.

18. The method of claim 13, wherein calculating a weight of said process layer based upon said sensed pressure comprises calculating a weight of said process layer by multiplying said sensed pressure and an area of said substrate covered by said process layer together.

19. The method of claim 13, wherein controlling at least one parameter of said deposition process based upon said calculated weight of said process layer comprises stopping said deposition process based upon said calculated weight of said process layer.

20. The method of claim 13, wherein controlling at least one parameter of said deposition process based upon said calculated weight of said process layer comprises

controlling at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said calculated weight of said process layer.

21. The method of claim 13, further comprising performing said deposition process for an additional duration if said calculated weight of said process layer is not within a preselected limit.

22. The method of claim 13, further comprising adjusting at least one parameter of said deposition process based upon said calculated weight of said process layer and performing said deposition process comprised of said adjusted parameter on at least one subsequently processed substrate.

23. A method, comprising:

providing a substrate;

performing a deposition process to form a process layer above said substrate;

measuring a mass of said process layer formed above said substrate; and

controlling at least one parameter of said deposition process based upon said measured mass of said process layer.

24. The method of claim 23, wherein providing a substrate comprises providing a substrate comprised of silicon.

25. The method of claim 23, wherein performing a deposition process to form a process layer above said substrate comprises performing at least one of a chemical vapor

deposition process, a plasma enhanced chemical vapor deposition process, a thermal growth process, and a physical vapor deposition process to form a process layer above said substrate.

26. The method of claim 23, wherein performing a deposition process to form a process layer above said substrate comprises performing a deposition process to form a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 above said substrate.

27. The method of claim 23, wherein measuring a mass of said process layer formed above said substrate comprises measuring a mass of said process layer using a balance.

28. The method of claim 23, wherein controlling at least one parameter of said deposition process based upon said measured mass of said process layer comprises stopping said deposition process based upon said measured mass of said process layer.

29. The method of claim 23, wherein controlling at least one parameter of said deposition process based upon said measured mass of said process layer comprises controlling at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said measured mass of said process layer.

30. The method of claim 23, further comprising performing said deposition process for an additional duration if said measured mass of said process layer is not within a preselected limit.

31. The method of claim 23, further comprising adjusting at least one parameter of said deposition process based upon said measured mass of said process layer and performing said deposition process comprised of said adjusted parameter on at least one subsequently processed substrate.

32. A method, comprising:

providing a substrate having a process layer formed thereabove;

performing an etching process to remove at least a portion of said process layer;

determining at least one of a weight and a mass of said removed portion of said process layer; and

controlling at least one parameter of said etching process based upon said determined weight or mass of said removed portion of said process layer.

33. The method of claim 32, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate comprised of silicon having a process layer formed thereabove.

34. The method of claim 32, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate having a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 formed thereabove.

35. The method of claim 32, wherein performing an etching process to remove at least a portion of said process layer comprises performing at least one of an anisotropic etching process and an isotropic etching process to remove at least a portion of said process layer.

36. The method of claim 32, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to reduce a thickness of said process layer.

37. The method of claim 32, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to pattern said process layer.

38. The method of claim 32, wherein determining at least one of a weight and a mass of said removed portion of said process layer comprises:

providing a pressure sensor that senses a change in pressure as a result of removing said portion of said substrate; and

calculating said weight or said mass of said removed portion of said process layer based upon said sensed change in pressure.

39. The method of claim 38, wherein providing a pressure sensor comprises providing a pressure sensor in contact with said substrate.

40. The method of claim 38, wherein calculating said weight or said mass of said removed portion of said process layer based upon said sensed change in pressure comprises calculating said weight of said removed portion of said process layer by multiplying said sensed change in pressure and a surface area of said removed portion of said substrate.

41. The method of claim 32, wherein determining at least one of a weight and a mass of said removed portion of said process layer comprises measuring a weight or a mass of said removed portion of said process layer.

42. The method of claim 32, wherein controlling at least one parameter of said etching process based upon said determined weight of said removed portion of said process layer comprises stopping said etching process based upon said determined weight or mass of said removed portion of said process layer.

43. The method of claim 32, wherein controlling at least one parameter of said etching process based upon said determined weight or mass of said removed portion of said process layer comprises controlling at least one of a duration, a temperature, a power level and gas flow rate of said etching process based upon said determined weight or mass of said removed portion of said process layer.

44. The method of claim 32, further comprising performing additional etching operations on said process layer if said determined weight or mass of said removed portion of said process layer does not exceed a preselected value.

45. The method of claim 32, further comprising adjusting at least one parameter of said etching process based upon said determined weight or mass of said removed portion and performing said etching process comprised of said adjusted parameter on at least one subsequently process substrate.

46. A method, comprising:

providing a substrate having a process layer formed thereabove;

performing an etching process to remove at least a portion of said process layer;

providing a pressure sensor that senses a change in pressure as a result of removing said portion of said substrate;

determining at least one of a weight and a mass of said removed portion of said process layer based upon said sensed change in pressure; and

controlling at least one parameter of said etching process based upon said determined weight or mass of said removed portion of said process layer.

47. The method of claim 46, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate comprised of silicon having a process layer formed thereabove.

48. The method of claim 46, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate having a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 formed thereabove.

49. The method of claim 46, wherein performing an etching process to remove at least a portion of said process layer comprises performing at least one of an anisotropic etching process and an isotropic etching process to remove at least a portion of said process layer.

50. The method of claim 46, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to reduce a thickness of said process layer.

51. The method of claim 46, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to pattern said process layer.

52. The method of claim 46, wherein providing a pressure sensor comprises providing a pressure sensor in contact with said substrate.

53. The method of claim 46, wherein determining at least one of a weight and a mass of said removed portion of said process layer based upon said sensed change in pressure comprises calculating a weight of said removed portion of said process layer by multiplying said sensed change in pressure and a surface area of said removed portion of said substrate.

54. The method of claim 46, wherein controlling at least one parameter of said etching process based upon said determined weight or mass of said removed portion of said process layer comprises stopping said etching process based upon said determined weight or mass of said removed portion of said process layer.

55. The method of claim 46, wherein controlling at least one parameter of said etching process based upon said determined weight or mass of said removed portion of said process layer comprises controlling at least one of a duration, a temperature, a power level

and gas flow rate of said etching process based upon said determined weight or mass of said removed portion of said process layer.

56. The method of claim 46, further comprising performing additional etching operations on said process layer if said determined weight or mass of said removed portion of said process layer does not exceed a preselected value.

57. The method of claim 46, further comprising adjusting at least one parameter of said etching process based upon said determined weight or mass of said removed portion and performing said etching process comprised of said adjusted parameter on at least one subsequently process substrate.

58. A method, comprising:

providing a substrate having a process layer formed thereabove;

performing an etching process to remove at least a portion of said process layer;

measuring at least one of a weight and a mass of said removed portion of said process layer; and

controlling at least one parameter of said etching process based upon said measured weight or mass of said removed portion of said process layer.

59. The method of claim 58, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate comprised of silicon having a process layer formed thereabove.

60. The method of claim 58, wherein providing a substrate having a process layer formed thereabove comprises providing a substrate having a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0 formed thereabove.

61. The method of claim 58, wherein performing an etching process to remove at least a portion of said process layer comprises performing at least one of an anisotropic etching process and an isotropic etching process to remove at least a portion of said process layer.

62. The method of claim 58, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to reduce a thickness of said process layer.

63. The method of claim 58, wherein performing an etching process to remove at least a portion of said process layer comprises performing an etching process to pattern said process layer.

64. The method of claim 58, wherein measuring at least one of a weight and a mass of said removed portion of said process layer comprises measuring a weight or a mass of said removed portion of said process layer using at least one of a scale and a balance.

65. The method of claim 58, wherein controlling at least one parameter of said etching process based upon said measured weight or mass of said removed portion of said

process layer comprises stopping said etching process based upon said measured weight or mass of said removed portion of said process layer.

66. The method of claim 58, wherein controlling at least one parameter of said etching process based upon said measured weight or mass of said removed portion of said process layer comprises controlling at least one of a duration, a temperature, a power level and gas flow rate of said etching process based upon said measured weight or mass of said removed portion of said process layer.

67. The method of claim 58, further comprising performing additional etching operations on said process layer if said measured weight or mass of said removed portion of said process layer does not exceed a preselected value.

68. The method of claim 58, further comprising adjusting at least one parameter of said etching process based upon said measured weight or mass of said removed portion and performing said etching process comprised of said adjusted parameter on at least one subsequently process substrate.

69. A system, comprising:

a deposition tool for performing a deposition process to form a process layer above a substrate;

a pressure sensor in contact with said substrate for sensing a pressure induced as a result of said process layer formed above said substrate; and

a controller for controlling at least one parameter of said deposition process based upon said sensed pressure.

70. The system of claim 69, wherein said deposition tool is adapted to perform at least one of a chemical vapor deposition process, a plasma enhanced chemical vapor deposition process, and a physical vapor deposition process.

71. The system of claim 69, wherein said deposition tool is adapted for depositing a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0.

72. The system of claim 69, wherein said controller is a stand-alone device.

73. The system of claim 69, wherein said controller is resident on said deposition tool.

74. The system of claim 69, wherein said controller is adapted to stop said deposition process based upon said sensed pressure.

75. The system of claim 69, wherein said controller is adapted to adjust at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said sensed pressure.

76. A system, comprising:

a deposition tool for performing a deposition process to form a process layer above a substrate;

a metrology tool in contact with said substrate for measuring at least one of a weight and a mass of said process layer formed above said substrate; and

a controller for controlling at least one parameter of said deposition process based upon said measured weight or mass.

77. The system of claim 76, wherein said deposition tool is adapted to perform at least one of a chemical vapor deposition process, a plasma enhanced chemical vapor deposition process, and a physical vapor deposition process.

78. The system of claim 76, wherein said deposition tool is adapted for depositing a process layer comprised of at least one of a metal, polysilicon, silicon dioxide and a material having a dielectric constant less than 5.0.

79. The system of claim 76, wherein said controller is a stand-alone device.

80. The system of claim 76, wherein said controller is resident on said deposition tool.

81. The system of claim 76, wherein said controller is adapted to stop said deposition process based upon said measured weight or mass.

82. The system of claim 76, wherein said controller is adapted to adjust at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said measured weight or mass.

83. The system of claim 76, wherein said metrology too is comprised of at least one of a scale and a balance.

84. A system, comprising:

means for performing a deposition process to form a process layer above a substrate;

means for sensing a pressure induced as a result of said process layer formed above said substrate; and

a controller means for controlling at least one parameter of said deposition process based upon said sensed pressure.

85. A system, comprising:

means for performing a deposition process to form a process layer above a substrate;

means for measuring at least one of a weight and a mass of said process layer formed above said substrate; and

a controller means for controlling at least one parameter of said deposition process based upon said measured weight or mass.

86. A system, comprising:

an etch tool for performing an etching process to remove at least a portion of a process layer formed above a substrate;

a pressure sensor in contact with said substrate for sensing a change in pressure resulting from the removal of at least a portion of said process layer; and

a controller for controlling at least one parameter of said etching process based upon said sensed pressure.

87. The system of claim 86, wherein said etch tool is adapted to perform at least one of an isotropic and an anisotropic etching process.

88. The system of claim 86, wherein said etch tool is adapted to perform an etching process to thin said process layer.

89. The system of claim 86, wherein said etch tool is adapted to perform an etching process to pattern said process layer.

90. The system of claim 86, wherein said etch tool is adapted to perform an etch process to remove at least a portion of a process layer comprised of at least one of a metal, polysilicon, and a material having a dielectric constant less than 5.0.

91. The system of claim 86, wherein said controller is a stand-alone device.

92. The system of claim 86, wherein said controller is resident on said etch tool.

93. The system of claim 86, wherein said controller is adapted to stop said etching process based upon said sensed pressure.

94. The system of claim 86, wherein said controller is adapted to control at least one of a duration, a temperature, a power level and a gas flow rate of said etching process based upon said sensed pressure.

95. A system, comprising:

an etch tool for performing an etching process to remove at least a portion of a process layer formed above a substrate;

a metrology tool in contact with said substrate for measuring at least one of a weight and a mass of said removed portion of said process layer; and

a controller for controlling at least one parameter of said etching process based upon said measured weight or mass.

96. The system of claim 95, wherein said etch tool is adapted to perform at least one of an isotropic and an anisotropic etching process.

97. The system of claim 95, wherein said etch tool is adapted to perform an etching process to thin said process layer.

98. The system of claim 95, wherein said etch tool is adapted to perform an etching process to pattern said process layer.

99. The system of claim 95, wherein said etch tool is adapted to perform an etch process to remove at least a portion of a process layer comprised of at least one of a metal, polysilicon, and a material having a dielectric constant less than 5.0.

100. The system of claim 95, wherein said controller is a stand-alone device.

101. The system of claim 95, wherein said controller is resident on said etch tool.

102. The system of claim 95, wherein said controller is adapted to stop said etching process based upon said measured weight or mass.

103. The system of claim 95, wherein said controller is adapted to control at least one of a duration, a temperature, a power level and a gas flow rate of said etching process based upon said measured weight or mass.

104. The system of claim 95, wherein said metrology tool is comprised of at least one of a scale or a balance.

105. A system, comprising:

means for performing an etching process to remove at least a portion of a process layer formed above a substrate;

means for sensing a change in pressure resulting from the removal of at least a portion of said process layer; and

a controller means for controlling at least one parameter of said etching process based upon said sensed pressure.

106. A system, comprising:

means for performing an etching process to remove at least a portion of a process layer formed above a substrate;

means for measuring at least one of a weight and a mass of said removed portion of said process layer; and

a controller means for controlling at least one parameter of said etching process based upon said measured weight or mass.